

EXECUTIVE SUMMARY

Devils Lake Basin Water Management Plan



PREPARED BY:
Devils Lake Basin Joint Water Resource Board
and the North Dakota State Water Commission

2002

This is only a summary of the 2002 Edition of the Devils Lake Basin Water Management Plan. For a more detailed explanation of background, issues, and goals, please reference the complete plan.

Mission Statement

It is the goal of the Devils Lake Basin Joint Water Resource Board to develop a comprehensive, coordinated water management plan for the Devils Lake Basin that will protect the economic and biological values of the Devils Lake Basin while providing optimum benefits for agriculture, wildlife and fisheries, outdoor recreation, economic development, and its' citizens.

Purpose of the Plan

The purpose of this document is to provide general background on water and land resources, to define water management issues, to update project needs, to state objectives, and to provide strategies designed to manage the Devils Lake Basin in a manner that best meets the needs of all interested parties. Once the Subject Committees and the Devils Lake Basin Joint Water Resource Board have approved the updated basin management plan, the process of implementation of strategies can begin.

Perhaps the most important aspect of this plan is ensuring that all relevant state, federal, and private agencies, should make a unified effort to

achieve the management strategies and objectives of this plan, which will serve as a constant reminder of what actions need to be completed in the basin.

This plan is a working plan, and will need to be periodically updated. It uses a loose-leaf format to outline components of the plan so the results of future work can be added with little effort. **Any changes in objectives or strategies must be approved by the Devils Lake Basin Joint Water Resource Board with consultation from the four Subject Committees, and will be reflected in future plan revisions.**

Future Updates

The 2002 update of the Devils Lake Basin Water Management Plan represents the conditions of the Devils Lake Basin at this time. The purpose of the Devils Lake Basin Water Management Plan is to provide a convenient and accessible document that will provide the citizens of the Devils Lake Basin and state, federal, and private agencies with a road map of what has been done, what is being done, and what remains to be done.

While this plan intends to give a long-term vision of water management in the basin, it is the nature of water management issues to change. It is important to continue to make progress towards the basin's long-term water management goals, while still retaining the flexibility necessary to change this plan to best meet short-term needs.

As a result, the Devils Lake Basin Water Management Plan will be reviewed every three years, or less if necessary, by the Devils Lake Basin Joint Water Resource Board, with the assistance of the Subject Committees and Technical Support Groups. The Subject Committees have also recognized the need to keep their objectives, management issues, strategies and procedures current, and have set timetables for the updating of the respective sections.

Maintaining the Devils Lake Basin Water Management Plan provides long-term guidance, but it is also a document that must be kept current in the overall effort to resolve many of the Devils Lake Basin's water management problems. Many excellent studies and programs have been initiated in the Devils Lake Basin, only to be forgotten or not kept updated. A good example of a study that will need to be continually updated is the Bureau of Reclamation's Road and Railroad Crossing Inventory for the Edmore, Mauvais, and Big Coulee crossings. The responsibility of maintaining this powerful tool for hydrologic modeling has

been given to the Devils Lake County Water Resource Boards, and they have agreed to do so. The success of this plan is dependent upon all interests continually working together for the betterment of everyone.

Subject Committee Recommendations

Agriculture Objectives

1. Ensure that the rights of property owners are protected.
2. Increase both the economic and environmental benefits of agriculture through the implementation of better land and water management practices.
3. Provide flood protection for private and public lands sufficient to protect against a specific flood event.
4. Develop specific plans and goals for the Devils Lake Basin Joint Water Resource Board and the sub-basin advisory boards, in order to promote better conservation management practices.
5. Identify local, state and federal regulations that can help or hinder implementation of the Devils Lake Basin Water Management Plan.
6. Increase farm income through increased commodities production using better water management practices.

Economic Development Objectives

1. Capitalize on the economic resources of the Devils Lake Basin regardless of water levels.
2. Create a basin-wide economic development effort utilizing existing basin economic development organizations.

Recreation Objectives

1. Stabilize Devils Lake to enhance recreation opportunities in the Devils Lake Basin.
2. Develop recreational opportunities in and around Devils Lake.
3. Develop recreational opportunities in the Devils Lake Basin.

Wildlife and Fisheries Objectives

1. Enhance grassland, woodland and wetland acreages for the betterment of wildlife and fisheries production in the Devils Lake Basin.
2. Manage water quality for the benefit of Devils Lake Basin fisheries and wildlife.
3. Encourage continuation and intensification of agricultural conservation practices that are beneficial to agriculture, wildlife and fisheries in the Devils Lake Basin.

4. Implement programs that encourage increased youth participation in hunting, fishing and outdoor recreation.

5. Improve communication between agricultural and outdoor interest groups.

The Three-Pronged Approach

As a result of the extremely high water levels on Devils Lake, and the corresponding land and property damages, the need for a solution to the current water management problems has become apparent. What is needed is a comprehensive, understandable, watershed-level plan to affect true change in the basin, which this document represents. A three-pronged approach, including upper basin water management, infrastructure protection, and an outlet to the Sheyenne River, has been developed to alleviate flooding in the basin.

Upper Basin Water Management

The first aspect of the approach is upper basin water management. The 1995 Devils Lake Basin Water Management Plan concluded that with the proper incentives to landowners, some wetland areas in the upper basin could hold additional waters in high-flow conditions, and this has been done with the North Dakota State Water Commission sponsored Extended Storage Acreage / Available Storage Acreage Programs, the Natural Resource Conservation Service, the North Dakota Natural Resource Trust, and the United States Fish and Wildlife Service National Wildlife Refuge on Lake Alice. Various governmental agencies have, or are planning the development, management, and enhancement of wetland acres for the dual purposes of wildlife habitat and water storage. Currently, nearly 14,000 acres of wetlands have been restored or set aside for the dual purpose of water storage and wildlife habitat, and these agencies estimate that the area of those wetlands could eventually be greater than 27,000 acres if all proposed projects are constructed.

The North Dakota State Water Commission enacted the Available Storage Acreage Program (ASAP) in 1996. This program paid landowners to store water that would have contributed to the flooding around Devils Lake. The program ran from 1996-1999 and stored 8,000-22,000 acre-feet per year at a total cost of \$3.5 million. In 2000, the North Dakota State Water Commission changed the program from ASAP to the Extended Storage Acreage Program (ESAP). The revised program is a ten-year water storage program managed by the

Devils Lake Basin Joint Water Resource Board. It was thought that a ten-year program would be more cost effective in addressing the long-term nature of the flooding problem. Currently, ESAP is storing 800 acre-feet at a cost of \$12,000 per year.

There have also been five different studies completed in the Devils Lake Basin, trying to determine the actual storage of wetland depressions. The most accurate and detailed of these studies is the one completed by the United States Army Corps of Engineers in 2001. Wetland storage in the study was determined utilizing a combination of digital elevation models (DEM), aerial photos, National Wetlands Inventory (NWI) data, flow direction data, and digital quad maps. Wetlands were split into two categories, possibly intact and possibly drained.

Researchers found that there were approximately 202,990 acres of possibly intact wetlands, with approximately 481,604 acre-feet of storage, and 92,429 acres of possibly drained wetlands with approximately 132,729 acre-feet of storage. However, when running 10 different climate sequences based on United State Geological Survey hydrologic models, and incorporating both wet and dry years, the average annual runoff reduction was only 23,841 acre-feet. That amount of storage would only lower Devils Lake at its current elevation, by approximately 2 inches annually. However, storing surface water alone is not the whole answer.

In addition to changing the quantity of water flowing into Devils Lake, there have also been projects by various agencies that address the quality of water, not only in Devils Lake, but also in the basin as a whole. The United States Geological Survey has produced 22 papers on the hydrogeology of Devils Lake since the last plan was published, addressing subjects ranging from variations in water quality in Devils Lake and upper basin lakes, plankton communities, to reconstructing historical hydrological conditions.

The Devils Lake Basin Joint Water Resource Board in association with the North Dakota Natural Resource Conservation Service is currently working on a restoration demonstration projects on portions of the Starkweather Coulee that will demonstrate the value of different agricultural techniques, such as buffer strips. These types of projects have the potential to significantly improve the quality of water entering Devils Lake. In addition to actual projects, many of the Technical Support Groups, such as the North Dakota State University Extension Service, and the Natural

Resource Conservation Service, have active educational programs in place to increase the sustainability, environmental friendliness, and profit of agricultural land use practices in the upper basin. The various projects, and programs in place in the Devils Lake Basin demonstrate the amount of progress that has been made as a result of the 1995 plan. However, much work remains to be done.

Infrastructure Protection

The second aspect of the three-pronged approach is infrastructure protection. Since 1996, Federal Emergency Management Agency's (FEMA), National Flood Insurance Program (NFIP), through waiving contract rules and adding an endorsement for cyclical lake coverage, has paid a total of 500 claims for the purposes of salvage, relocation, and demolition, and an additional 250 claims for the protection of existing structures, totaling over \$28 million dollars.

The North Dakota Department of Transportation has spent over \$100 million on improvements and maintenance for roads affected by the rise of Devils Lake. A great deal of work has been completed since 1995, and if waters continue to rise, additional funds will need to be allocated towards road improvements. Generally, the roads have been raised to an elevation of 1,455 feet amsl, with the base wide enough to eventually go to 1,465 feet amsl and the bridges to 1,465 feet amsl. Currently, the Department of Transportation is refining options to relocate Highway 281 around the Minnewaukan area.

The U.S. Army Corps of Engineers has systematically raised the City of Devils Lake levees. The levees will now protect against lake levels up to elevation 1,450 feet amsl (top of levee at elevation 1,457 feet amsl). The existing dikes can be raised three more feet without additional foundation work, which will protect to a lake elevation of 1,452 to 1,453 feet amsl for an estimated cost of about \$7 million. Infrastructure in Minnewaukan was rebuilt in 2000 and planning for structural and non-structural alternatives continues.

Over \$1 million has been spent, primarily by FEMA, to relocate pipes and pump stations to keep the Ramsey County rural sewer system operable. Continued loss of customers and added operating costs is making it difficult to maintain the system.

Over the past 10 years, over \$400 million dollars have been spent on infrastructure protection in the Devils Lake Basin. If the lake continues to rise, more will undoubtedly be spent.

Outlet to the Sheyenne River

The third prong is an outlet from Devils Lake. Any outlet project needs to be carefully planned in order to ensure that water discharged from Devils Lake would meet the water quality standards of the receiving streams. Increased erosion and flooding are additional issues. Many alternatives have been studied. Currently, there are two proposed outlet projects, one being pursued by the State of North Dakota and the other by the United States Army Corps of Engineers.

The United States Army Corps of Engineers is designing a permanent 300-cfs outlet from Pelican Lake to the Sheyenne River. In January of 2003, the United States Army Corps of Engineers is anticipating the release of the final EIS. Current estimates for the total project cost of the 300 cfs federal outlet from Pelican Lake, constrained by a 350 mg/l sulfate level in the Sheyenne River are \$97.65 million dollars, plus the cost of annual operation.

The State of North Dakota is pursuing a temporary phased implementation emergency outlet project out of West Bay to the Sheyenne River. The first phase of the state project is a 100 cfs capacity outlet, with the next phases including the capability of expanding the outlet project to 200 or 300 cfs. The outlet would consist of two pumping stations, 3.3 miles of pipe, and 9.4 miles of open channel. The project will utilize existing United States Army Corps of Engineers EIS studies to assess downstream impacts. The final design for the entire project has been completed. The final contract for the first components of the projects has been awarded, and work began in October, the schedules calls for it to be in operation in 2004. The entire project is estimated to cost approximately \$25 million.

In addition to water quality concerns, the need also exists to closely monitor the effects of increased flows on the Sheyenne River to minimize disruption of that system. Average seasonal flows in the Sheyenne River have been 62.4 cfs, although during the course of the year, flows are higher, as evidenced by the river's 600 cfs channel capacity. Both the State of North Dakota and the United States Army Corps of Engineers are looking at adding up to 300 cfs, so downstream communities must be considered. However, the potential danger that a 6,000 cfs natural overflow poses to lives, property, and water quality in Valley City, Lisbon, Fargo and Grand Forks, necessitates alleviating the flooding threat as quickly as possible.

The “Fourth Prong”

While this plan demonstrates that there has been a great deal of progress made by all groups on the water problems of the Devils Lake Basin, an area that has often been overlooked, is economic revitalization and recovery, the so-called “fourth prong.” While the first three prongs focus on physical solutions to water management problems, the economy of the Devils Lake Basin, while less physically tangible, is no less important.

Some progress has been made in this area, with the Economic Development Subject Committee outlining objectives and strategies in this area. The majority of the work on economic recovery and revitalization has been done at the local level, though a report prepared in 2000 by CEO Praxis for the City of Devils Lake and the Mayor’s Business Committee, and an economic summit held in Devils Lake in 2000 with over 20 state and federal agencies represented demonstrates progress in this area.

However, economic revitalization and recovery efforts are often limited by a lack of funding and technical expertise. The small number of programs in this area highlights the need for local citizens, state, federal, and private agencies to focus more of their energy in the future on this vital area. Solving the water management problems of the Devils Lake Basin is not only vitally important to the economic future the communities and residents of the basin, but has important impacts on the economic viability of the entire state of North Dakota.

Results and Developments Since the 1995 Plan

There has been a great deal of work done by many different state, federal, and private agencies since the 1995 plan was completed. Projects have focused on water storage, water quality, habitat restoration, wildlife enhancement and restoration, infrastructure protection, and the extensive back-ground work required for the construction of the proposed emergency outlets. As a result, the Devils Lake Basin is perhaps the most exhaustively studied region in North Dakota.

The following section details some of the major projects and dollars spent studying the Devils Lake Basin, and potential repercussions of the proposed Devils Lake emergency outlet. Beyond what is listed here, each of these organizations along with many others, have devoted innumerable man-hours of study and research in the Devils Lake Basin.

Bureau of Reclamation

The Bureau of Reclamation has recently completed a “Road and Railroad Crossing Inventory” for the Edmore, Mauvais, and Big Coulee crossings. The Bureau of Reclamation will be adding the St. Joe and Calio Coulees in the future. This project is important, as it will greatly enhance the ability of agencies and individuals to design more accurate hydrological models of the Devils Lake Basin. The Bureau of Reclamation has also done a wetlands inventory and drained wetlands water storage capacity estimation for the St. Joe-Calio Coulee sub-basin of the Devils Lake Basin.

Devils Lake Basin Joint Water Resource Board

The Devils Lake Basin Joint Water Resource Board has been extremely active in water management issues since the 1995 Devils Lake Basin Water Management Plan was originally published. Since the 1995 plan was published, the Devils Lake Basin Joint Water Resource Board has worked extensively with various state, federal, and private agencies on a multitude of projects, both large and small.

The Devils Lake Basin Joint Water Resource Board has been involved in myriad types of projects, including studies looking into: water quality, water storage, flood management, wetland inventories, the State Water Plan, sedimentation studies for several points along the south side of Devils Lake, water control structure maintenance and improvements, and treatment options for Devils Lake.

The Devils Lake Basin Joint Water Resource Board has also been involved in cooperative projects designed to restore wetland, forested, mixed-grass, and tall-grass prairie habitat, sending informational mailings to residents of the basin and downstream interests, land restoration for wildlife habitat, and environmentally friendly agricultural practices. The Devils Lake Basin Joint Water Resource Board also maintains a position specifically designed to inform the public and promote Devils Lake Basin interests.

As of 2002, the Devils Lake Basin Joint Water Resource Board and the North Dakota State Water Commission have also been actively pursuing a reconnaissance water utilization study in the Devils Lake Basin with Bartlett & West Engineers. In addition to having the potential to increase the yield of crops within the basin, irrigation would generate large indirect economic impacts for local communities and the state. Water utilization in the upper basin would have the added benefit of

lowering the water level on Devils Lake, by taking irrigation water from upper basin lakes, constructed reservoirs, or even Devils Lake itself. The Devils Lake Basin Joint Water Resource Board has been encouraged by the initial reports provided, and is currently pursuing the development of eight test sites to verify the benefits of the project.

Garrison Diversion Conservancy District

The Garrison Diversion Conservancy District has played an active role in water development in the Devils Lake Basin, having spent nearly \$700,000 on recreational developments, and nearly \$7,400,000 on MR&I developments since 1990.

Natural Resource Conservation Service

The Natural Resource Conservation Service has several programs that they administer, including the Federal Water Bank Program, which provides 3,700 acres of land for floodwater storage in the Devils Lake Basin. There are still interested landowners, and it is hoped that the next federal budget will make more funding available for the 8,250 acres waiting to be enrolled. The Emergency Watershed Protection program has enrolled 2,777 acres for the purpose of watershed protection. Another program, the Environmental Quality Incentive Program, has contracts on 193,530 acres in the Devils Lake Basin.

In addition to these programs, the Natural Resource Conservation Service is active in educating landowners about the benefits of different types of agricultural practices, with the Sustainable Agriculture and Research Education grant. The Natural Resource Conservation Service is also currently involved in association with the Devils Lake Basin Joint Water Resource Board, looking at conservation and management techniques along the Starkweather Coulee and Morrison outlet.

North Dakota Department of Health

The North Dakota Department of Health has completed a study examining the chemical, physical and biological parameters of Devils Lake. This study looked at how water quality changes in the lake over time, and what affects that those roads that bisect the lake have on water quality. In addition, the North Dakota Department of Health also does periodic water quality testing on the Devils Lake chain of lakes, conducting a complete water quality analysis at six sites, four to six times annually. The North Dakota Department of Health also does 319 non-point water pollution source BMPs (Best Management Practices) in the

upper basin. The North Dakota Department of Health was involved in a major project in the 1991-1992 designed to reduce nutrient loading by the City of Devils Lake, where a water treatment plant was constructed on a cost-share basis with the city. This innovative project captured municipal waste, and treated it using an aquatic plant known as lemna. This treatment system resulted in a reduction of phosphorous input into Devils Lake by 20 percent to 33 percent, and drastic reductions in nitrogen and ammonia as well. This project had the added benefit of providing nutrient-rich topsoil to be used for agriculture.

North Dakota Department of Transportation

The North Dakota Department of Transportation has spent over \$100,000,000 on improvements and maintenance for roads affected by the rise of Devils Lake. Generally, the roads have been raised to an elevation of 1455 feet amsl, with the base wide enough to eventually go to 1465 feet amsl and the bridges to 1465 feet amsl. A great deal of work has been completed since 1995, and if waters continue to rise, additional funds will need to be allocated towards road improvements.

North Dakota Forest Service

The North Dakota Forest Service owns and manages approximately 13,278 acres of state forested lands. The North Dakota Forest Service has done numerous surveys of Devils Lake to determine the amount of acres of forest inundated since 1995.

North Dakota Game and Fish Department

The North Dakota Game and Fish Department has and continues to do a great deal of work in the Devils Lake Basin. North Dakota Game and Fish Department maintains an active sports fishery on Devils Lake, and since 1995 they have stocked over 3,657,000 fish at a cost of approximately \$64,000. This agency also plays an active role in providing and maintaining angler facilities such as boat ramps, and parking lots, spending over \$800,000 so far. The North Dakota Game and Fish Department is also active in the development of land devoted to wildlife production, through programs such as the Private Land Initiative, which has raised over \$660,000 since 1995 for the counties in the basin, and is still expanding the program. The North Dakota Game and Fish Department has also funded work done through the Agriculture Department in the basin, in regards to the State Waterbank Program, totaling over \$890,000 so far.

North Dakota Natural Resources Trust

The North Dakota Natural Resource Trust is another organization that has done a lot of work in terms of wildlife and fisheries habitat, and also for sustainable agriculture. The North Dakota Natural Resource Trust has also developed a demonstration program, the Grand Harbor Watershed Management Project, which has taken nearly a half-mile of land in the Devils Lake Basin, and developed and maintained it with the goals of meeting the needs of all interests; agriculture, wildlife enthusiasts, sportsmen, and the various levels of government.

In total, the North Dakota Natural Resource Trust has restored over 18,000 acres of land in the Devils Lake Basin for various types of habitat, including 4,086 acres of wetlands, 10,608 acres of uplands, and 3,937 acres of conservation tillage. The North Dakota Natural Resource Trust is working with over 300 producers, and has spent over \$1,391,000 on these projects.

North Dakota Parks & Recreation Department

The North Dakota Parks and Recreation Department is involved with maintenance and enhancement of the three state park facilities in the basin; Graham's Island, Shelters Grove, and Black Tiger Bay. Parks in the Devils Lake Basin have been plagued by access issues, as water continued to rise. Despite these challenges, North Dakota Parks and Recreation District has worked to relocate recreational structures to keep ahead of rising water. Because of their work, park access in the basin has been reduced by the current wet cycle, but not eliminated. The North Dakota Parks and Recreation District has spent \$570,000 in the maintenance of their facilities due to the rise of the lake.

North Dakota State University

Extension Service

The North Dakota State University Extension Service is active in disseminating knowledge about sustainable land use practices in North Dakota. While the North Dakota State University Extension Service does not break down their projects to the basin level, their efforts have been integral in increasing the amount of land that is used for conservation tillage, and encouraging alternative crops that are more suited to the current conditions in the basin.

North Dakota State Water Commission

The North Dakota State Water Commission's mission is to assist in the implementation of the

three-pronged approach to solving the flooding problem on Devils Lake. The North Dakota State Water Commission has comprehensive water management in North Dakota as its primary goal.

The North Dakota State Water Commission has spent \$3,500,000 on both the ASAP and ESAP programs in the Devils Lake Basin, which paid landowners in the upper basin to store excess water on their land. The ASAP program stored 8,000-22,000 acre-feet per year. In 2000, the North Dakota State Water Commission changed the program from ASAP to the Extended Storage Acreage Program (ESAP). The revised program is a ten-year water storage program managed by the Devils Lake Basin Joint Water Resource Board. It was thought that a 10-year program would be more cost effective in addressing the long-term nature of the flooding problem. Currently, ESAP is storing 800 acre-feet at a cost of \$12,000 per year.

The North Dakota State Water Commission has also co-funded a Bartlett & West Engineering study with the Devils Lake Basin Joint Water Resource Board into the feasibility of irrigation as a means of lowering lake levels, and enhancing crop production in the Devils Lake Basin. The North Dakota State Water Commission has also played an integral role in assisting and coordinating efforts with the Devils Lake Basin Joint Water Resource Board to develop and update the Devils Lake Basin Water Management Plan and other water management projects. The North Dakota State Water Commission, in association the Devils Lake Basin Joint Water Resource Board, also funds a full-time engineering position.

The State of North Dakota is pursuing a phased implementation outlet project limited by water quality and quantity constraints from West Bay on Devils Lake to the Sheyenne River. The first phase of the project would pump up to 100 cubic feet per second, with the potential for expansion to 200 or 300 cfs later. The outlet would consist of two pumping stations, 3.3 miles of pipe, and 9.4 miles of open channel. The project will utilize existing U.S. Army Corps of Engineers EIS studies to assess downstream impacts. The final design for the entire project has been completed. The final contract for the first components of the projects has been awarded, and work is expected to begin in October of 2002. The initial cost estimate for the construction of the 100 cfs outlet is approximately \$25 million, with an annual operation and management cost of approximately \$500,000.

United States Army Corps of Engineers

The United States Army Corps of Engineers has spent millions of dollars studying the feasibility of and impacts from the Devils Lake emergency outlet. In pursuance of that goal, the United States Army Corps of Engineers has completed or funded studies on water quality, upper basin water storage, water management, flood management, wetland inventories, sedimentation, outlet alternatives, biological inventories, cultural impacts and demographics, economic feasibility of various project options, hydrology, soils, public surveys, mitigation, Geographic Information Systems (GIS) analysis of the basin, and planning.

Since 1998, approximately \$44 million has been spent by the United State Army Corps of Engineers, the State of North Dakota and the City of Devils Lake to raise the dike system protecting the City of Devils Lake. The dike currently has a top elevation of 1,457 feet amsl, and is approximately 7.2 miles in length. The dike protects the City up to lake elevations of 1,450 feet amsl. The dike begins on the west side of Devils Lake near the airport, goes around the south end, and comes out by Highway 2, near the Mertens Lake View Dairy. With Devils Lake getting closer to the current protection level of the dike, the United States Army Corps of Engineers, and the City are pursuing funding to raise the dike three feet, to elevation 1,460 amsl. This would protect the City of Devils Lake up lake levels of 1,452 feet amsl. The last dike was constructed to allow this three-foot raise without changing the base of the dike. If Devils Lake reaches an elevation of 1,448 feet amsl at freeze-up, the United States Army Corps of Engineers will begin construction to raise the dike.

In addition to that lengthy list, the United States Army Corps of Engineers has also been involved in assisting in the development of North Dakota's State Water Plan, appointing a full-time position to work with downstream interests, has initiated land acquisition for potential outlet construction. As a result of the multitudes of studies that the United States Army Corps of Engineers has commissioned, the Devils Lake Basin is perhaps the most thoroughly examined geographic area in the world. The Corps of Engineers has also played a vital role in driving the development of an outlet plan, and will certainly continue to do so in the future.

United States Fish and Wildlife Service

In the Devils Lake Basin, the United States Fish and Wildlife Service manages the National Wildlife Refuge System including easement and fee title tracts, and administers the federal Aid in Sport Fish

and Wildlife Programs. An important facility is the Sully Hill National Game Preserve, which is part of the National Wildlife Refuge System. Sully Hill receives 38-43,000 visitors annually. Flooding is causing severe damage at the Preserve. Due to rising water levels on Devils Lake, the United States Fish and Wildlife Service has submitted a 5-year plan to relocate many of the facilities at Sully Hill.

In addition to managing Sully Hill, the United States Fish and Wildlife Service actively acquires land through fee title and easement, and manages wetlands for the dual purposes of water storage and wildlife/waterfowl production, including the Lake Alice Refuge. In total, the United States Fish and Wildlife Service has 21 projects completed within the Devils Lake Basin, totaling 6,268 acres in area, with potential to store 9,130 acre-feet of water, and has 22 additional projects planned that would total 5,086 acres in area, with 9,713 acre-feet in storage, which would bring the total to 11,354 acres, with 18,843 acre-feet in storage. The United States Fish and Wildlife Service has also done work on a bird watching trail in the Devils Lake Basin.

United States Geological Survey

The United States Geological Survey has played a vital role in the study of various hydrogeological aspects of the Devils Lake Basin. In all, the United States Geological Survey has completed nearly 50 studies, or papers, on the hydrogeology of the Devils Lake Basin, 22 since 1995, and their work is vital in keeping decision-makers informed with the best, most up-to-date information. The United States Geological Survey also is involved in stream gauging, and water quality monitoring in the basin.

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